

In the Claims

1. (Currently Amended) A method of cooling a low Z target material of a neutron source assembly, comprising:

providing, by using a nozzle submerged in liquid gallium, a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target material within the neutron source assembly to cool the low Z target material;

providing a reservoir of liquid gallium; and

pumping the liquid gallium, serially, from the reservoir, through the nozzle, such that the liquid gallium impinges upon the low Z target material in the neutron source assembly and cools the target material, from the neutron source assembly directly to a heat exchanger to remove heat from the liquid gallium, and from the heat exchanger to the reservoir.

Claims 2-3 (Cancelled)

4. (Currently Amended) The method of claim 12, wherein the target material comprises beryllium.

5. (Currently Amended) A neutron source assembly having a liquid cooled target, comprising:

an accelerator based neutron source including a low Z target material that is bombarded by accelerated particles to produce a neutron flux; and

a cooling system to circulate liquid gallium through said accelerator based neutron source to cool the low Z target material;

said cooling system including a nozzle, said nozzle being submerged in liquid gallium, to ~~provide~~ providing a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target material within the accelerator based neutron source;

said cooling system further including,

a reservoir of liquid gallium;

a heat exchanger, and

means for serially circulating said liquid gallium from said reservoir through said nozzle to impinge upon said surface of the low Z target material within said accelerator based neutron source, from said accelerator based neutron source directly to said heat exchanger, and from said heat exchanger to said reservoir.

Claim 6 (Cancelled)

7. (Currently Amended) The neutron source assembly of claim 56, wherein said means for circulating comprises a pump.

8. (Currently Amended) A liquid cooling system for a neutron source assembly, said cooling system comprising:

a reservoir of liquid gallium;

a heat exchanger ~~in fluid connection with said reservoir of liquid gallium;~~

a nozzle, said nozzle being submerged in liquid gallium, ~~to provide~~ providing a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of a low Z target material within the neutron source assembly; and

means for serially circulating said liquid gallium from said reservoir through said nozzle to impinge upon said surface of the low Z target material within the neutron source assembly, from the neutron source assembly directly to said heat exchanger, and from said heat exchanger to said reservoir ~~said liquid gallium between said reservoir of liquid gallium, said heat exchanger and the neutron source assembly to remove heat from a neutron generating low Z target material within the neutron source assembly.~~